REMARKS

An Excess Claim Fee Payment Letter is submitted herewith to cover excess claims added by this Amendment.

Claims 1-22 are all the claims presently pending in the application. Claims 1-16 have been amended and claims 17-22 have been added to claim additional features of the invention. Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current Amendment.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability.

Claims 1, 4, 6, 14 and 15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by JP 7-171318 (JP '318). Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '318. Claims 1, 2, and 6-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0 811 479 A2 (EP '479) in view of Nitta (U.S. Patent No. 6,028,028). Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '318 or EP '479 and Nitta, as applied to claim 1, and further in view of EP 0 831 572 A1 (EP '572). Claims 5 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0 630 755 A2 (EP '755) or JP 9-295406 (JP '406) in view of JP '318 or EP '479 and Nitta.

These rejections are traversed by the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to an air-permeable filter (and an ink cartridge having such a filter) which includes a laminate, the laminate including at least one porous material layer comprising at least one resin selected from the group consisting of fluororesin and polyolefin resin, and at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer.

Conventional filters do not include an air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer. Therefore, such conventional filters do not provide good features such as

strength and elasticity.

The claimed invention, on the other hand, includes at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer. Therefore, the claimed invention includes an air-permeability substrate layer with excellent strength, elasticity, air-permeability, workability and fusibility.

II. THE 35 USC §112, SECOND PARAGRAPH REJECTION

Claim 12 stands rejected under 35 U.S.C. §112, second paragraph. Applicant notes that this claim has been amended to delete the term "preferably".

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw this rejection.

III. THE PRIOR ART REFERENCES

A. The JP '318 Reference

The Examiner alleges that JP '318 teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention that are neither taught nor suggested by the JP '318 reference.

JP '318 merely discloses premixed fine particles composed of at least one kind of polymer selected from polytetrafluoroethylene, a tetrafluoroethylene/hexafluoropropylene copolymer and polyvinylidene fluoride are bonded to the voids on the surface side of a permeable porous substrate obtained by sintering and molding graphy ultrahigh mol.wt. polyethylene (JP '318 at Abstract).

However, JP '318 does not teach or suggest "at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, having an outer surface bonded to said at least one porous material layer" as recited in claims 1 and 5. As explained in the Application, conventional ink cartridges have air vents in order to prevent negative pressure from developing which prevents normal ejection (Application at page 1, line 24-page 2, line 3). However, when the cartridge is tilted the air vent is dipped in ink, so that the ink leaks through the air vent (Application at page 2, lines 5-12).

The claimed invention, however, includes an air-permeable filter which may prevent ink from leaking through the air vent (Application at Figure 4; page 2, line 27-page 3, line 4). Specifically, the claimed air-permeable filter includes at least one air-permeable substrate layer having a tensile strength of 1 MPa or more (Application at page 10, lines 3-23). Moreover, the air-permeable substrate layer has an outer surface bonded to the porous material layer (Application at Figure 4; page 10, line 27 to page 11, line 8). For instance, it is explained that the complexing of the layers may be accomplished by stacking the two layers, heat-welding, ultrasonically welding, vibrationally welding, or by using an adhesive.

Clearly, the JP '318 reference does not teach or suggest these novel features. Indeed, JP '318 does not even teach a porous material layer. Instead, JP '318 merely teaches "fine particles" of a polymer which are "bonded to the voids... of a permeable porous substrate". (JP '318 at Abstract). Thus, the Examiner is equating "fine particles" of a polymer with a "layer" which is clearly unreasonable. Applicant notes that the word "layer" is defined as "a single thickness, coat, fold or stratum" (Webster's New World Dictionary, 3rd College Ed. 1988, page 766). Clearly, fine particles "bonded to voids" would not satisfy the commonly accepted definition of a "layer".

Further, as shown in Figure 4, the air-permeable substrate layer(s) in the claimed invention has an "outer surface" bonded to the porous material layer(s). Examiner also equates the permeable porous substrate in JP '318 with the air-permeable substrate layer of the claimed invention. However, we would point out that the substrate in JP '318 does not have "an outer surface" bonded to a porous material layer. Instead, JP '318 explains only that fine particles of polymer are "bonded to the voids" in the substrate. In other words, the Examiner is equating the "voids" in the substrate with an outer surface which is clearly unreasonable.

In summary, Applicant notes that JP'318 describes a filter which comprises adhering to pores on the front surface side of a permeable porous substrate obtained by sinter-molding an ultrahigh molecular weight ethylene-based polyolefin resin, fine particle fillers having a particle diameter smaller than the polyolefin resin which makes the principal component which constitutes the porous substrate.

As is clear from the description in col. 2, lines 29-31 of JP '318, the fine particle

fillers are entered into the pores on the front surface side of the porous substrate to make the pores small, by which the collection efficiency can be raised when it was used as a filter.

However, JP '318 is silent about laminating the porous film and an air-permeable substrate layer nor the tensile strength of the air-permeable substrate layer of 1MPa or more. Accordingly, the present invention is different in its constitution from the JP '318 filter.

Further, the meaning of defining tensile strength of the air-permeable substrate layer to 1MPa or more in the present invention is clear from the description in the specification of the present application.

For example, in Comparative Example 2 on page 15 of the specification of the present Application, an air-permeable filter was produced using an air-permeable substrate layer having a tensile strength of 0.9 MPa (the porous material layer was the same as in Example 1) and an ink cartridge was produced using the filter. However, as is clear from the results shown in Table 1 on page 16 in the specification, the performance thereof was inferior in the ink leakage test to that of the product fallen within the scope of the present invention.

Accordingly, the present invention takes a peculiar effect by defining the tensile strength of the air-permeable substrate layer to 1 MPa or more.

Therefore, JP '318 does not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The EP '479 and Nitta References

The Examiner alleges that EP '479 and Nitta would have been combined to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

EP '479 discloses a battery separator membrane which includes a microporous polyolefin membrane and a polyolefin nonwoven fabric laminated on at least one surface of the microporous polyolefin membrane. The composite membrane has a thickness of 25 to 200 μm, a porosity of 30 to 70%, an air permeability of 100 to 2000 sec/100cc and a surface opening area ratio of 50 to 90% on at least one outer surface thereof. The microporous polyolefin membrane comprises a matrix polyolefin component which is a polyolefin having

a weight average molecular weight of 5×10^5 or more or a polyolefin mixture containing the polyolefin having a weight average molecular weight of 5×10^5 or more, and has a porosity of 30 to 95%, an air permeability of 100 to 2000 sec/100cc, an average open pore diameter of 0.001 to 1 μm and a tensile strength at break of 500 kg/cm^2 or more. The microporous polyolefin membrane may further comprise a shutdown polymer component to shut down the pores, thereby making the composite membrane impermeable. The polyolefin nonwoven fabric comprises fine fibers and has an air permeability of 0.1 to 100 sec/100cc and a basis weight of 5 to 50 g/m^2. The polyolefin nonwoven fabric prevents the composite membrane from melting down at a low temperature thereby preventing the short-circuit between the electrodes (EP '479 at Abstract).

Nitta discloses recording sheets which comprise a support (I) having formed on a surface thereof an image-recording/receiving layer (II) selected from an ink-receiving layer (IIa) for receiving a water-based ink ejected by an ink-jet recording technique, a thermosensitive recording layer (IIb), a coating layer (IIc) for laser printing and a thermal transfer image-receiving layer (IId). The support (I) has a laminated structure comprising a plain weave fabric (A) and, bonded thereto with an adhesive, a water-proof stretched resin film (B) having a machines-direction Clark stiffness (S value) of from 8 to 300, a transverse-direction Clark stiffness of from 8 to 300 and a thickness of from 20 to 300 μm. The image-recording/receiving layer (II) is provided on the support on the side where the stretched resin film layer (B) is present. The inventive recording sheets have a tough surface and have both excellent ink absorption and clarity of developed color. Also, the inventive recording papers are water-proof, provide a water-proof image and have excellent tear resistance (Nitta at Abstract).

However, Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to different matters. Specifically, EP '479 is directed to a battery separator membrane (EP '479 at Abstract) whereas Nitta is merely directed to a tough recording sheet having excellent ink absorption and color clarity (Nitta at Abstract). Clearly, no person of ordinary skill in art would consider combining the features of EP '479 with the features of Nitta.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner supports the combination by merely stating that "[i]t would have been obvious ... to incorporate the material of Nitta into the air-permeable filter of EP 0 811 479 A2 to provide an air-permeable filter having good mechanical rigidity" which is merely a conclusory statement and insufficient to support the combination.

Moreover, like JP '318, neither EP '479 nor Nitta teaches or suggests "at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer" as recited in claims 1 and 5. As explained above, the claimed invention includes an air-permeable filter which may prevent ink from leaking through an air vent in an ink cartridge (Application at Figure 4; page 2, line 27-page 3, line 4). Specifically, the claimed air-permeable filter includes at least one air-permeable substrate layer having a tensile strength of 1 MPa or more (Application at page 10, lines 3-23). Moreover, the air-permeable substrate layer has an outer surface bonded to the porous material layer (Application at Figure 4; page 10, line 27 to page 11, line 8). For instance, it is explained that the complexing of the layers may be accomplished by stacking the two layers, heat-welding, ultrasonically welding, vibrationally welding, or by using an adhesive.

Clearly, neither EP '479 nor Nitta teaches or suggests these novel features. Indeed, EP '479 merely discloses a microporous polyolefin membrane with a polyolefin non-woven fabric on one surface of the membrane (EP '479 at Abstract). In other words, unlike the claimed invention, EP '479 clearly does not disclose a substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer. Therefore, the membrane in EP '479 would not have the strength, elasticity, air-permeability, workability and fusibility of the air-permeable substrate layer of the claimed invention.

Further, Nitta merely discloses a recording sheet which is totally unrelated to an air-permeable filter. Moreover, Nitta may disclose a nonwoven fabric sheet which may be formed using a polyethylene resin powder (Nitta at col. 4, lines 25-54). However, Nitta makes no mention of a substrate layer having a tensile strength of 1 MPa or more, and having

an outer surface bonded to said at least one porous material layer which may be included in the claimed invention.

Therefore, these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

C. The EP '572 Reference

The Examiner alleges that EP '572 would have been combined with either JP '318, or with EP '479 and Nitta to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

EP '572 discloses a cylindrical vent filter member which includes a thermoplastic elastomer member, a water-repellant film fused to one end of the elastomer member (EP '572 at col. 6, lines 44-55).

However, these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to totally different matters. Specifically, as noted above, JP '318 merely discloses a sintered plastic filter fine polytetrafluoroethylene particles bonded to voids in the sintered plastic (JP '318 at Abstract). Further, EP '479 is directed to a battery separator membrane (EP '479 at Abstract) and Nitta is merely directed to a tough recording sheet having excellent ink absorption and color clarity (Nitta at Abstract).

EP '572, on the other hand, is directed to a cylindrical elastomer member with a water-repellant film fused to one end for use in automobile electrical apparatuses (EP '572 at col. 1, lines 20-24; Abstract). As shown in Figure 1A, the water repellant film is not formed as a layer on the elastomer member but is formed perpendicularly to the elastomer member. In other words, the water repellant film has nothing to do with the function of the elastomer member.

Clearly, no person of ordinary skill in the art would have considered combining the features of JP '318 and those of EP '572. Likewise, no person of ordinary skill in art would consider combining the features of EP '479 with the features of Nitta and with the features of EP '572.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner supports the combination by merely stating that "[i]t would have been obvious ... to incorporate the water-repellant and oil-repellant coating of EP 0 831 572 A1 into the air permeable filters of JP 7-171318 or European Patent Application EP 0 811 479 A2 and Nitta to prevent water and organic solvents from passing through the filter" which is merely a conclusory statement and insufficient to support the combination.

Moreover, EP '572, like JP '318, EP '479 and Nitta, does not teach or suggest "at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer" as recited in claims 1 and 5. As explained above, the claimed air-permeable filter includes at least one air-permeable substrate layer having a tensile strength of 1 MPa or more (Application at page 10, lines 3-23). Moreover, the air-permeable substrate layer has an outer surface bonded to the porous material layer (Application at Figure 4; page 10, line 27 to page 11, line 8). For instance, it is explained that the complexing of the layers may be accomplished by stacking the two layers, heat-welding, ultrasonically welding, vibrationally welding, or by using an adhesive.

Clearly, EP '572 does not teach or suggest these novel features. Indeed, EP '572 merely discloses a cylindrical elastomer member with a water-repellant film fused to one end (EP '572 at Figure 1A). However, neither of these features may reasonably be considered as equivalent to the air-permeable substrate in the claimed invention.

First, neither of these two structures performs a function like that of the substrate layer in the claimed invention. In addition, neither of these structures has an "outer surface" bonded to a "porous material layer" as in the claimed invention. Moreover, neither of these structures has a tensile strength of 1 MPa or more.

Therefore, these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

D. The EP '755 and JP '406 References

The Examiner alleges that EP '755 or JP '406 would have been combined with either

JP '318, or with EP '479 and Nitta to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

EP '755 discloses a discharge recovery process for an ink jet recording apparatus which forms an image on the recording medium by discharging the ink. It aims to prevent the increase in the running costs and the shortened life of a waste ink tank by preventing the wasteful ink consumption which may be caused by the dual use of an automatic recovery processing and a manual recovery processing after the replacement of an ink tank. EP '755 also aims to provide an ink jet recording apparatus with high safety and reliability as well as effecting an appropriate recovery by controlling the movement of head in involving the recovery (EP 755 at Abstract).

JP '406 discloses in a hydrophobic film unit 100, the whole of the outer peripheral end part of a circular hydrophobic film 101 is covered with a resin member 102 formed by insert molding and the resin member 102 itself has an annular shape having a square cross section. An ultrasonic fusion rib 103 is provided to one surface of the annular part of the resin member 102 in a circular shape and this hydrophobic film unit 100 is fixed to the atmosphere communication hole part of an ink tank by welding the resin member 102 (especially the part of the rib 103) and a resin constituting at least peripheral part of the atmosphere communication port of the ink tank. Or, in the hydrophobic film unit 100, the whole of the outer peripheral end part of the circular hydrophobic film 101 is covered with an annular elastic member having an oval cross section formed by insert molding (JP '406 at Abstract).

However, Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to totally different matters. Specifically, EP 755 is directed to a discharge recovery process for an ink jet recording apparatus, whereas JP '406 is merely directed to a hydrophobic film unit.

In contrast to these references, JP '318 discloses a sintered plastic filter fine polytetrafluoroethylene particles bonded to voids in the sintered plastic (JP '318 at Abstract), EP '479 is directed to a battery separator membrane (EP '479 at Abstract) and Nitta is directed to a tough recording sheet having excellent ink absorption and color clarity (Nitta at

Abstract).

Clearly, no person of ordinary skill in the art would have considered combining the features of EP '755 or JP '406 with JP '318. Likewise, no person of ordinary skill in art would consider combining the features of EP '755 or JP '406 with the features of EP '479 and Nitta.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner supports the combination by merely stating that "[i]t would have been obvious ... to incorporate the air-permeable filters of JP 7-171318 or European Patent Application EP 0 811 479 A2 and Nitta into the ink cartridges of EP 0 630 755 A2 or JP 9-295406 to provide vent filters for the ink cartridges having good mechanical rigidity to prevent the filters from being damaged in transit to prevent ink from being lost from the cartridge" which is insufficient to support the combination.

Moreover, Applicant submits that neither EP '755 nor JP '406, like EP '572, JP '318, EP '479 and Nitta, teaches or suggests "at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer" as recited in claims 1 and 5. As explained above, the claimed air-permeable filter includes at least one air-permeable substrate layer having a tensile strength of 1 MPa or more (Application at page 10, lines 3-23). Moreover, the air-permeable substrate layer has an outer surface bonded to the porous material layer (Application at Figure 4; page 10, line 27 to page 11, line 8).

Clearly, neither EP '755 nor JP '406 teach or suggest these novel features. Indeed, the Examiner basically concedes this stating "EP 0 630 755 A2 and JP 9-295406 do not disclose ... an air-permeable substrate layer having a tensile strength of 1MPa or more." Further, as noted above, none of the other references, JP '318, EP '479, Nitta, EP '572, teach or suggest these novel features. Therefore, these references do not make up for the deficiencies in EP '755 and JP '406.

Therefore, these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

IV. FORMAL MATTERS AND CONCLUSION

The Examiner objects to the Abstract as containing legal phraseology. Applicant notes that the Abstract has been amended to address the objections of the Examiner.

The Examiner objects to claims 1-4 and 6-15 as not including the word "an" between "for" and "ink", and further objects to claim 4 as not including the word "weight" between "molecular" and "polyethylene". Applicant notes that these claims have been amended to address the concerns of the Examiner.

In view of the foregoing, Applicant submits that claims 1-22, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 7/29/02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT:

Please amend the Abstract to read as follows:

- - An air-permeable filter for an ink cartridge includes [is described, which comprises a laminate comprising] at least one porous material layer including [comprising] at least one resin selected from the group including [consisting of] fluororesin and polyolefin resin, and at least one air-permeable substrate layer having a tensile strength of 1 MPa or more. In addition, an [An] ink cartridge includes [is also described, which comprises] a space for receiving an ink and at least one air vent in which the air-permeable filter is provided. - -

IN THE CLAIMS:

Claims 1-16 have been amended as follows:

New claims 17-21 have been added.

1. (Amended) An air-permeable filter for an ink cartridge, said air-permeable filter comprising: [which comprises]

a laminate comprising:

at least one porous material layer comprising at least one resin selected from the group consisting of fluororesin and polyolefin resin; and

at least one air-permeable substrate layer having a tensile strength of 1 MPa or more, and having an outer surface bonded to said at least one porous material layer.

2. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein the air permeability of said air-permeable substrate is 300 sec/100 ml or less as represented by a Gurley number.

3. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein at least one layer of said laminate has been rendered water-repellent and oil-repellent.

4. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein

said porous material comprises [a] polytetrafluoroethylene and said air-permeable substrate comprises a ultrahigh molecular weight polyethylene.

5. (Amended) An ink cartridge comprising: [a space]

a case for receiving an ink; [and]

at least one air vent in said case; and [in which]

an air-permeable filter [is] provided in said at least one air vent, said air-permeable filter comprising: [comprises]

a laminate comprising:

at least one porous material layer comprising at least one resin selected from the group consisting of fluororesin and polyolefin resin; and

at least one air-permeable substrate layer having a tensile strength of 1 Mpa or more, and having an outer surface bonded to said at least one porous material layer.

6. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein the tensile strength of the air-permeable substrate is from 1 Mpa to 1,500 Mpa.

7. (Amended) The air-permeable filter for an ink cartridge according to claim 6, wherein the tensile strength of the air-permeable substrate is from 3 MPa to 500 Mpa.

8. (Amended) The air-permeable filter for an ink cartridge according to claim 2, wherein the Gurley number of the air-permeable filter is from 0.1 sec/100 ml to 300 sec/100 ml.

9. (Amended) The air-permeable filter for an ink cartridge according to claim 8, wherein the Gurley number of the air-permeable filter is from 0.5 sec/100 ml to 100 sec/100 ml.

10. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein the average diameter of the pores in the porous material is 10 μm or less.

11. (Amended) The air-permeable filter for an ink cartridge according to claim 10,

wherein the average diameter of the pores in the porous material is from 0.01 μm to 5 μm.

12. (Amended) The air-permeable filter for an ink cartridge according to claim 1, wherein the thickness of the porous material is [preferably] 2 μm or more.

13. (Amended) The air-permeable filter for an ink cartridge according to claim 12, wherein the thickness of the porous material is from 10 μm to 1,000 μm.

14. (Amended) The air-permeable filter for an ink cartridge according to claim 4, wherein the viscometric average molecular weight of the ultrahigh molecular weight polyethylene is 300,000 or more.

15. (Amended) The air-permeable filter for an ink cartridge according to claim 14, wherein the viscometric average molecular weight of the ultrahigh molecular weight polyethylene is from 500,000 to 10,000,000.

16. (Amended) The ink cartridge according to claim 5, wherein the porous material of the air-permeable [air-parmeable] filter faces an inner space of the ink cartridge.